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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,241	10/05/2005	Satoshi Sugahara	HIRA.0178	1606
38327	7590	05/31/2007		
REED SMITH LLP 3110 FAIRVIEW PARK DRIVE, SUITE 1400 FALLS CHURCH, VA 22042			EXAMINER VALENTINE, JAMI M	
			ART UNIT 2815	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/522,241

Applicant(s)

SUGAHARA ET AL.

Examiner

Jami M. Valentine, Ph.D.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-140 is/are pending in the application.
- 4a) Of the above claim(s) 1-70 and 83-140 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 71-82 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 11/25/05, 10/06/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of the Application***

1. **Claims 1-140** are pending in this application. Claims 1-70 are cancelled. Claims 71-140 are subject to a restriction requirement

### ***Election/Restrictions***

2. Applicant's election without traverse of Group I (Claims 71-82) in the reply filed on 4/23/07 is acknowledged. **Claims 83-140** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/23/07. **Claims 71-82** are examined in this Office action.

### ***US National Phase of PCT***

3. Acknowledgment is made that this application is the US national phase of international application PCT/JP03/09438 filed 25 July 2003 which designated the U.S. and claims benefit of JP 2002-217336, filed 25 July 2002.

### ***Foreign Priority***

4. Acknowledgment is made that the certified copy of the foreign priority document has been received in the national stage application from the International Bureau.

### ***Information Disclosure Statement***

5. Acknowledgment is made that the information disclosure statement has been received and considered by the examiner. If the applicant is aware of any prior art or any other co-pending applications not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

*Drawings*

6. The drawings are objected to because figures 7-15 and 16B are informal. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “second nonmagnetic electrode layer of said transistor is connected to a wordline” of claim 82 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet,

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even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 112*

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. **Claims 71-82** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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11. **Claim 71** has "a transistor" in the preamble, however the structure recited in the claim is not a transistor as one having ordinary skill in the art at the time the invention would recognize a transistor. At best, the use of "a transistor" is simply a label and at worst it is indefinite. In light of this lack of clarity, the label "a transistor" will be interpreted for examination in view of the existing prior art to mean a device. Additionally, existing any prior art structure with the same structure as the structure of claim 71 will be labeled as "a transistor".

12. **Claim 73** recites "said second nonmagnetic electrode layer". Claim 73 depends on claim 71, however, claim 71 does not include a second nonmagnetic electrode layer. There is insufficient antecedent basis for this limitation in the claim.

13. **Claim 73** recites "said first and second ferromagnetic barrier layers". Claim 74 depends on claim 72, however, claim 72 does not include a second ferromagnetic barrier layer. There is insufficient antecedent basis for this limitation in the claim.

14. **Claim 82** recites "said second nonmagnetic electrode layer ... said third nonmagnetic electrode layer ... said first nonmagnetic electrode layer" Claim 82 depends on claim 81, which depends on claim 71, however claims 71 or 81 do not recite said second nonmagnetic electrode layer ... said third nonmagnetic electrode layer ... first nonmagnetic electrode layer". There is insufficient antecedent basis for these limitations in the claim.

### ***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

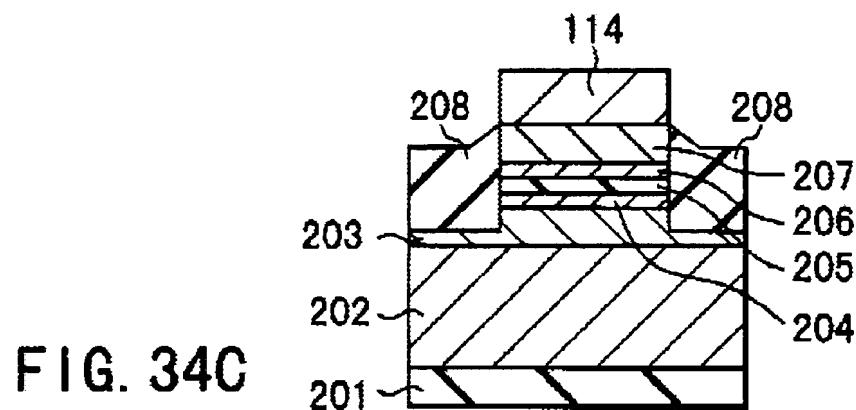
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 71-82** are rejected under 35 U.S.C. 102(b) as being anticipated by Noguchi et al. (US Patent Application Publication No 2003/0013843) hereinafter referred to as Noguchi.

- a spin injector ((203), (204), and (205)) for injecting spin-polarized hot carriers by a spin-filter effect;
- a spin analyzer ((205), (206), and (207)) for selecting the thus injected spin-polarized hot carriers by the spin-filter effect.

18. Additionally, claim 1 recites the performance properties of the spin injector and the spin analyzer. This functional limitation does not distinguish the claimed device over the prior art, since it appears that this limitation can be performed by the prior art structure of Noguchi. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) See MPEP 2114.



*Prior Art: Noguchi Figure 34C teaching a spin-tunneling device.*

19. Per **Claim 72** Noguchi discloses the device of claim 71 including where the spin injector ((203), (204), and (205)) comprises

- a first ferromagnetic barrier layer (204) through which the carriers can be transported by tunneling upon application of a voltage across said first ferromagnetic barrier layer;
- a first nonmagnetic electrode layer (203) joined to one end surface of said first ferromagnetic barrier layer; and
- a second nonmagnetic electrode layer (205) joined to the other end surface of said first ferromagnetic barrier layer.

20. Per **Claim 73** Noguchi discloses the device of claim 71 including where spin analyzer ((205), (206), and (207)) comprises

- a second ferromagnetic barrier layer; (206)
- a second nonmagnetic electrode layer (205) joined to one end surface of said second ferromagnetic barrier layer; and
- a third nonmagnetic electrode layer (207) joined to the other end surface of said second ferromagnetic barrier layer,
- wherein said second nonmagnetic electrode layer (205) is common to said spin injector and said spin analyzer.

21. Per **Claim 74** Noguchi discloses the device of claim 72 including where said first and second ferromagnetic barrier layers comprise a ferromagnetic semiconductor or a ferromagnetic insulator (column 39, lines 9-15).



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22. Per **Claim 75** Noguchi discloses the device of claim 72 including where the thickness of said second nonmagnetic electrode layer is smaller than the mean free path of the spin-polarized hot carriers in said second nonmagnetic electrode layer. (column 40 lines 30-34).

23. Per **Claims 76 through 80** Noguchi discloses the device of claim 72. These claims recite the performance properties of the device. These functional limitations do not distinguish the claimed device over the prior art, since it appears that this limitation can be performed by the prior art structure of Noguchi. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429,1431-32 (Fed. Cir. 1997) See MPEP 2114.

24. Per **Claim 81** Noguchi discloses the device of claim 71 and a memory circuit comprising a memory cell formed by the transistor according to claim 71. (column 38 lines 39-44)

25. Per **Claim 82** Noguchi discloses the device of claim 81 including where said second nonmagnetic electrode layer (205) of said transistor is connected to a wordline (202) , said third nonmagnetic electrode layer (207) of said transistor is connected to a bitline (114), said bitline is connected to a power supply via a load, and said first nonmagnetic electrode layer of said transistor is connected to ground (column 25 lines 41-59).

#### *Cited Prior Art*

26. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reference 1: US Patent No 6,403,999 by O'Handley et al.

Reference 2: US Patent Application Publication No 2002/0096698 by Flatte et al.

Reference 3: US Patent Application Publication No 2003/0012050 by Y. Iwasaki.

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***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jami M. Valentine, Ph.D. whose telephone number is (571) 272-9786. The examiner can normally be reached on Mon-Thurs 8:30am-7pm EST. **NOTE:** From June 18 through August 8<sup>th</sup>, The examiner will be available *only* on Thursdays and Fridays 8:30am-7pm EDT, due to jury duty service.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jami M Valentine, Ph.D.  
Examiner  
Art Unit 2815

JMV

  
**JEROME JACKSON  
PRIMARY EXAMINER**